AMENDMENTS TO THE CLAIMS

Please cancel all pending claims, i.e., claims 1-29, without prejudice or disclaimer of the subject matter recited therein and please add new claims 30-88 as follows:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claims 1-29 (canceled).

30. (New) A motor-driven compressor-alternator unit comprising:

pistons;

each piston having a large diameter portion and a smaller diameter portion extending from the large diameter portion;

the large diameter portion sliding within a first cylinder and providing a motor function during expansion followed by exhaust;

the smaller diameter portion sliding within a second cylinder and providing a compressor function; and

an arrangement that at least one of:

inactivates the motor function during compressor operation;

inactivates the compressor function during motor operation; and

activates ambient heat recovery during motor operation.

31. (New) The unit of claim 30, wherein the motor-driven compressor-alternator unit operates in one of mono-energy with compressed air, dual-energy, bi-mode and tri-mode.

32. (New) The unit of claim 30, wherein the smaller diameter portion functions as at least one of a compression thermal energy recovery piston and an ambient thermal energy recovery piston.

33. (New) The unit of claim 30, wherein an expansion function of the smaller diameter portion provides ambient thermal energy recovery.

34. (New) The unit of claim 30, wherein the arrangement comprises a plurality of valves which control air flow between the first and second cylinders.

35. (New) The unit of claim 30, further comprising a plurality of heat exchangers arranged to cool an air flow during a compression stage and arranged to heat the air flow during an ambient thermal energy recovery stage.

36. (New) The unit of claim 30, wherein the smaller diameter portion of one of the pistons comprises a different diameter than the smaller diameter portion of another of the pistons.

37. (New) The unit of claim 30, wherein, during compressor operation, the pistons are structured and arranged to compress air in several decreasing volume stages.

38. (New) The unit of claim 30, wherein the large diameter portion of one of the pistons comprises a different diameter than the large diameter portion of another of the

pistons.

39. (New) The unit of claim 38, wherein the one of the pistons and the other of the pistons comprise identical expansion piston surface areas.

40. (New) The unit of claim 38, wherein the one of the pistons and the other of the pistons comprise identical weights so as to provide a correct balancing of the reciprocating masses.

41. (New) The unit of claim 30, further comprising a control system that controls top dead center of the pistons.

42. (New) The unit of claim 41, wherein the control system comprises a first pivotally mounted lever arm and two second arms, each second arm being movably coupled to the first pivotally mounted lever arm and one of the pistons.

43. (New) The unit of claim 42, wherein the first pivotally mounted lever arm comprises a pivot axis which more or less centrally disposed and wherein each second arm is movably coupled to the first pivotally mounted lever arm via a pin.

44. (New) The unit of claim 42, wherein the pistons comprise opposed pistons which are movably mounted about a common axis.

45. (New) The unit of claim 44, wherein the pivot axis comprises a fixed axis which is roughly aligned with the common axis.

46. (New) The unit of claim 43, further comprising a control rod movably coupled to the first pivotally mounted lever arm and a crankshaft.

47. (New) The unit of claim 46, further comprising a pin movably connecting the control rod to the first pivotally mounted lever arm, wherein the pin is arranged between the pivot axis and a connection between the first pivotally mounted lever arm and one of the second arms.

48. (New) The unit of claim 30, further comprising a motor flywheel adapted to be driven by an electric motor.

49. (New) The unit of claim 30, further comprising a motor flywheel adapted to be driven by an electronically controlled electric motor.

50. (New) The unit of claim 30, further comprising a motor flywheel adapted to be driven by an electric motor powered by a household electrical power system.

51. (New) The unit of claim 30, further comprising a system for controlling a rotation speed of the unit via an electric motor, whereby the unit can be operated at high speeds during filling of a high pressure storage tank coupled to the unit and at slower speeds when the high pressure storage tank is filled.

52. (New) The unit of claim 30, wherein the unit is adapted to be driven by an electric motor which can produce electricity during motor operation, whereby the electricity can be used for recharging a battery.

53. (New) The unit of claim 52, wherein the electric motor comprises an alternator which is structured and arranged to rotate at least one revolution so as to start the motor operation of the unit.

54. (New) The unit of claim 53, wherein the alternator and electric motor comprise a motor driven alternator unit which is adapted to occasionally participate in increasing motor torque.

55. (New) The unit of claim 53, wherein the motor driven alternator unit is adapted to function as a speed reducer and is capable of recovering electrical energy during at least one of vehicle deceleration and vehicle braking.

56. (New) The unit of claim 30, further comprising a storage tank which receives compressed air from the pistons and which supplies compressed air to the pistons.

57. (New) The unit of claim 30, further comprising an ambient thermal energy recovery device and a buffer tank coupled to the unit.

58. (New) The unit of claim 30, further comprising a thermal heater structured and arranged to heat compressed air.

59. (New) The unit of claim 58, wherein the thermal heater comprises a burner which uses a fossil fuel, whereby the thermal unit is adapted to at least one of increase a volume of the compressed air passing therethrough and increasing a pressure of the compressed air passing therethrough.

60. (New) The unit of claim 58, wherein the thermal heater uses a solid-gas reaction type thermochemical process based on transformation by evaporation of a reagent fluid contained in an evaporator.

61. (New) The unit of claim 58, wherein the thermal heater uses liquid ammonia in a gas which reacts with a solid reagent contained in a reactor to produce heat.

62. (New) The unit of claim 61, wherein the solid reagent comprises salts.

63. (New) The unit of claim 62, wherein the salts comprises one of calcium, manganese, and barium chlorides.

64. (New) The unit of claim 60, wherein heat that is required to condense the reagent fluid is provided during compressor operation.

65. (New) The unit of claim 64, further comprising an electric heating element which assists in generating the heat.

66. (New) The unit of claim 58, wherein the thermal heater comprises a burner heating system which uses energy from a fossil fuel and a thermochemical heating device.

67. (New) The unit of claim 66, wherein the burner heating system is structured and arranged to regenerate the thermochemical heating device by providing heat required by a reactor to cause a desorption of gaseous ammonia which recondenses in an evaporator, and which continues heating of compressed air passing through a finned pipe of the thermal heater.

68. (New) The unit of claim 30, wherein the unit is adapted to function in a standalone manner and without using a storage tank for storing high pressure compressed air.

69. (New) The unit of claim 30, wherein the unit operates with compressed air supplied by one or more compression stages of the pistons, whereby the compressed air is reheated with a heating system which increases at least one of a volume and a pressure of the compressed air.

70. (New) The unit of claim 69, wherein the unit operates by reinjecting the compressed air into each expansion chamber of each first cylinder, whereby expansion of the compressed air in the first cylinders produces a power stroke.

71. (New) The unit of claim 30, further comprising a thermal heater which receives exhaust air from the first cylinders one of directly and via one or more compression stages , whereby the exhaust air is subjected to a temperature increase.

72. (New) The unit of claim 30, further comprising a safety valve arranged on an exhaust circuit of the unit, whereby the safety valve controls an air pressure and releases excess air into an atmosphere.

73. (New) The unit of claim 30, further comprising a thermal heater and a high pressure compressed air storage tank, whereby, before being introduced into the thermal heater, the unit is adapted to supply compressed air generated during compressor operation to the high pressure compressed air storage tank.

74. (New) The unit of claim 30, wherein the unit is adapted to operate, at low speeds, with compressed air supplied from a high pressure storage tank, whereby the unit generates zero pollution.

75. (New) The unit of claim 30, wherein the unit is adapted to operate, at high speeds, with compressed air supplied from a high pressure storage tank and heated with a thermal heater which uses energy generated from a fossil fuel.

76. (New) The unit of claim 30, wherein the unit is adapted to operate with three energy sources which comprise compressed air from a high pressure storage tank, compressed air which is heated by a thermochemical heater, and compressed air which is heated with a thermochemical heater which comprises a reactor that causes desorption of gaseous ammonia and an evaporator which recondenses the gaseous ammonia.

77. (New) The unit of claim 30, wherein the unit is adapted to operate with four energy sources.

78. (New) The unit of claim 30, wherein the unit is adapted to one of produce electricity for household and provide emergency power.

79. (New) The unit of claim 30, wherein the unit is adapted to provide emergency power and is capable of being switched on automatically, whereby, when the unit is switched on automatically, compressed air contained in a storage tank drives the unit.

80. (New) A combination of the unit of claim 30 and a 2-stroke engine.

81. (New) A combination of the unit of claim 30 and a 4-stroke engine.

82. (New) A combination of the unit of claim 30 and a diesel engine.

83. (New) A combination of the unit of claim 30 and a compressor driven independently of the unit.

84. (New) The unit of claim 30, further comprising a crank lever system coupled to the pistons.

85. (New) A motor-driven compressor-alternator unit comprising:

two pistons;

each piston having a large diameter portion and a smaller diameter portion extending from the large diameter portion;

each large diameter portion sliding within a first cylinder;

each smaller diameter portion sliding within a second cylinder;

levers connecting the two pistons to a crankshaft; and

first valves which allow the unit to operate as a compressor; and

second valves which allow the unit to operate as a motor.

86. (New) The unit of claim 84, further comprising a system which provides for ambient heat recovery during motor operation.

87. (New) A motor-driven compressor-alternator unit comprising:

two pistons;

each piston having a large diameter portion and a smaller diameter portion extending from the large diameter portion;

each large diameter portion sliding within a first cylinder;

each smaller diameter portion sliding within a second cylinder;

levers connecting the two pistons to a crankshaft; and

first valves which allow the unit to operate as a compressor; and

second valves which allow the unit to operate as a motor,

wherein, during motor operation, the first valves are closed, and

wherein, during compressor operation, the first valves are allowed to operate.

88. (New) The unit of claim 84, further comprising at least one pipe for supplying compressed air from one of the first valves associated with one of the two pistons to another of the first valves associated with another of the two pistons.